FIGURE 1

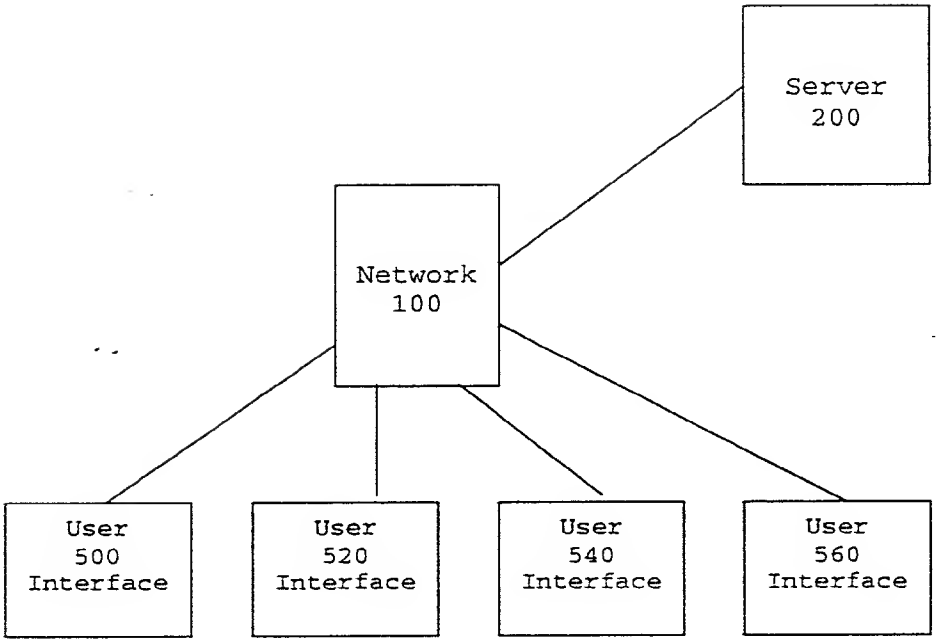

Server
200
Network
100
User
500
Interface
User
520
Interface
User
540
Interface
User
560
Interface

FIGURE 2

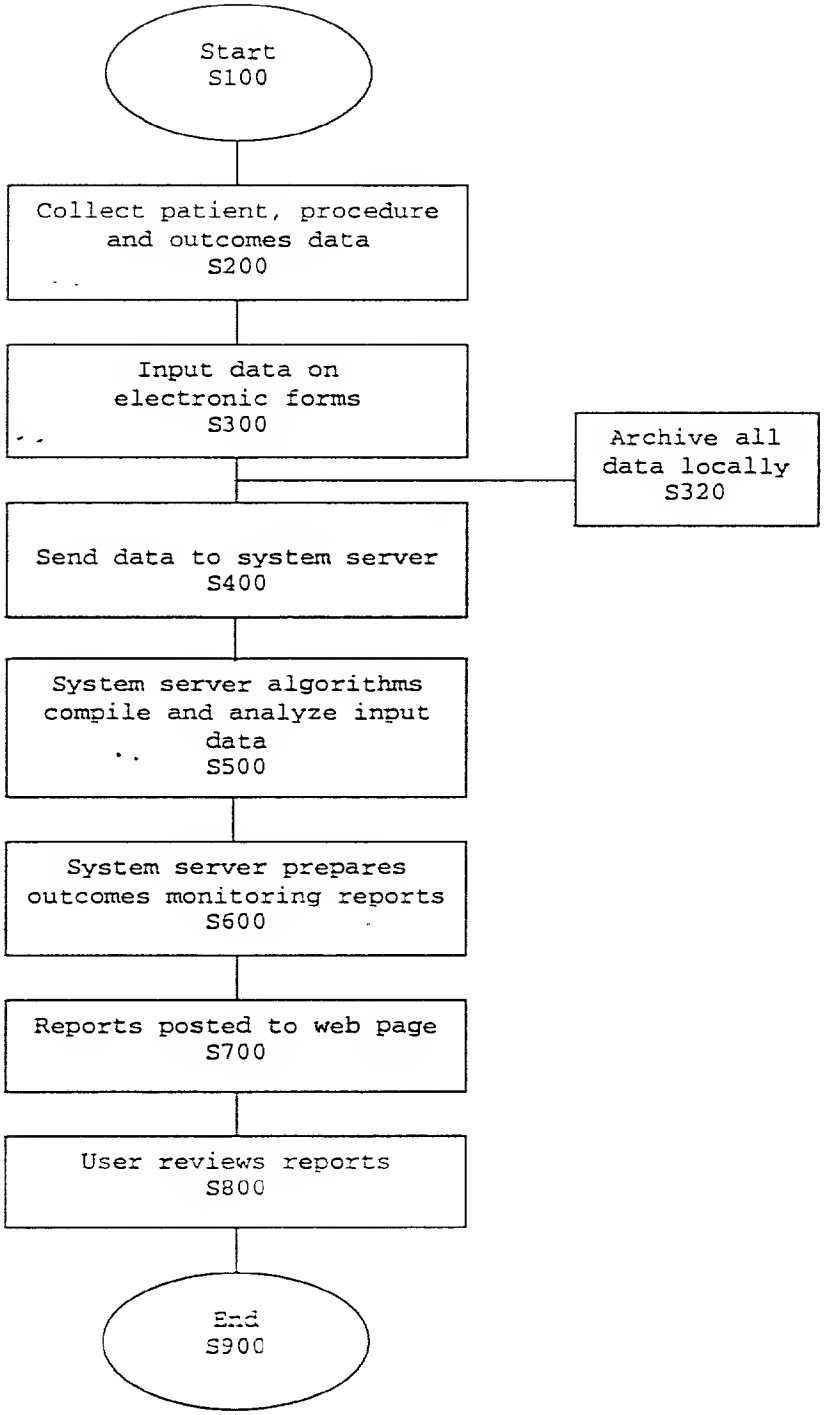

Start
S100
Collect patient, procedure and outcomes data
S200
Input data on electronic forms
S300
Archive all data locally
S320
Send data to system server
S400
System server algorithms compile and analyze input data
S500
System server prepares outcomes monitoring reports
S600
Reports posted to web page
S700
User reviews reports
S800
End
S900

FIGURE 3

Uploading Medical Records and Patient Interview Information

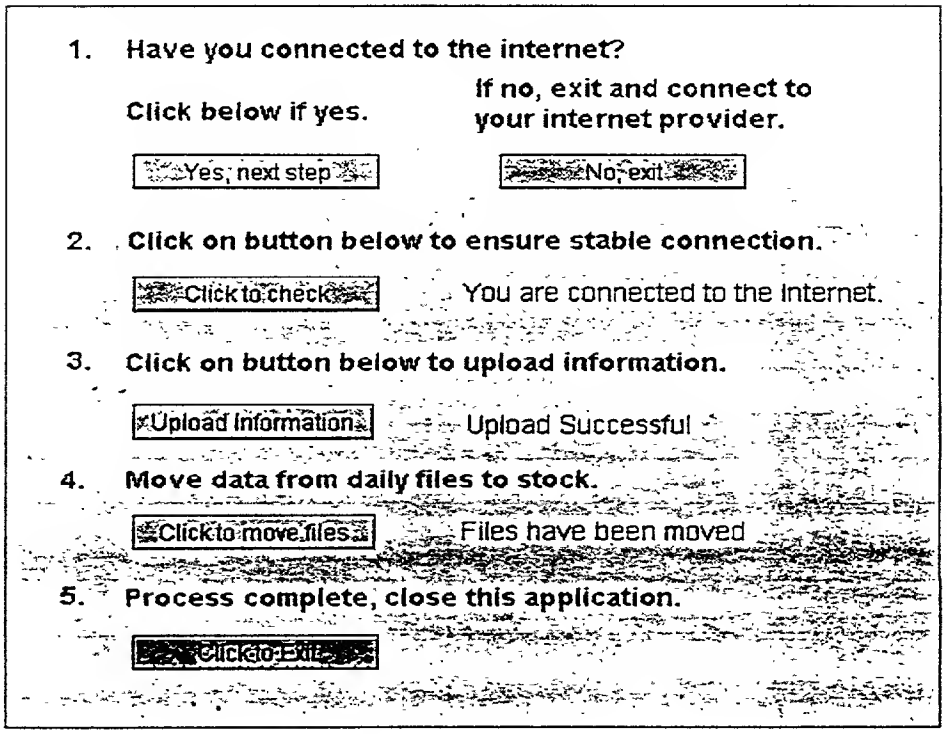


FIGURE 4

SAMPLE CENTER

EXECUTIVE BENCHMARK TABLE: INDICATOR STATUS AND TRENDS

Quarter 1, 1999 to Quarter 4, 1998

Table was created on 09/16/1999

	Arthroscopy, Knee	Carpal Tunnel	Cataract Removal	Hernia Repair	Laparoscopy, Gyne
Perioperative Complications (ind1)	⊙↘	●↘	⊙⇔	⊙	⊙↗
Delayed in Discharge (ind2)	●↗	●↗	●↘	⊙	○↘
Returns to Surgery (ind3)	⊙⇔	⊙⇔	⊙⇔	⊙	⊙⇔
Admits to Hospital (ind4)	⊙⇔	⊙⇔	⊙⇔	⊙	⊙⇔
Pain Episodes Not Relieved (ind5)	⊙⇔	⊙⇔	⊙↗	⊙	⊙⇔
Care Not Needed After Discharge (IND6)	⊙⇔	⊙↘	⊙⇔	⊙	⊙↘
Pain Controlled After Discharge (IND7)	○↗	⊙↗	⊙↗	⊙	⊙↗
Satisfied Patients (IND8)	⊙↗	⊙↗	⊙↗	⊙	⊙↗
Effective Discharge Instructions (IND9)	⊙⇔	⊙⇔	⊙⇔	⊙	⊙⇔
Patients Prepared for Self-Care (IND10)	⊙⇔	⊙⇔	⊙⇔	⊙	⊙⇔

Comparison with all centers (where you are now)		Comparison of current results with those for the previous period (where you are going)	
○	- Better than average	↗	- Improving
⊙	- Average	⇔	- No change
●	- Worse than average	↘	- Worsening

Return to Previous Screen

FIGURE 5

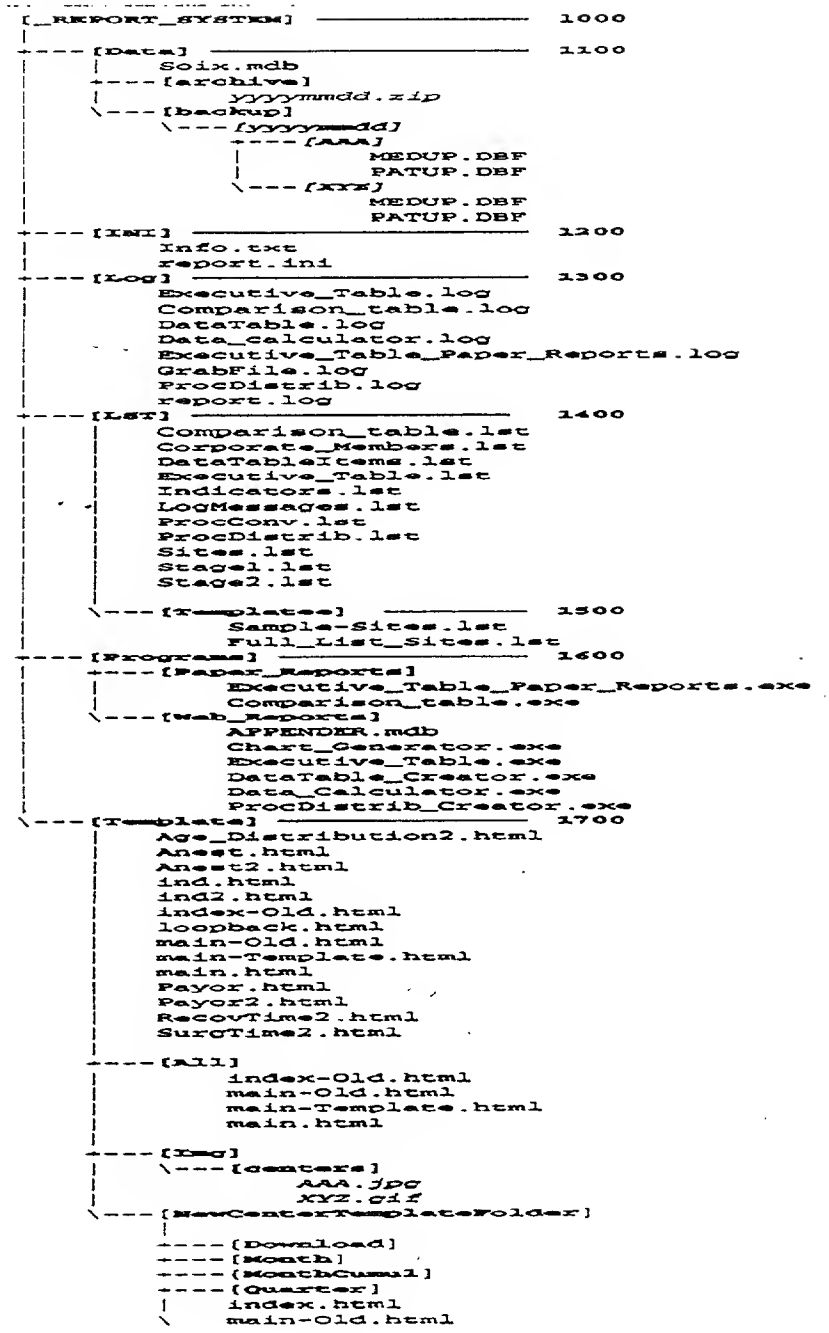

[_REPORT_SYSTEM] 1000
[Data] 1100
Soix.mdb
[archive]
yyyymmdd.zip
[backup]
[yyyymmdd]
[AAA]
MEDUP.DBF
PATUP.DBF
[XYZ]
MEDUP.DBF
PATUP.DBF
[INI] 1200
Info.txt
report.ini
[Log] 1300
Executive_Table.log
Comparison_table.log
DataTable.log
Data_calculator.log
Executive_Table_Paper_Reports.log
GrabFile.log
ProcDistrib.log
report.log
[LST] 1400
Comparison_table.lst
Corporate_Members.lst
DataTableItems.lst
Executive_Table.lst
Indicators.lst
LogMessages.lst
ProcConv.lst
ProcDistrib.lst
Sites.lst
Stage1.lst
Stage2.lst
[Templates] 1500
Sample-Sites.lst
Full_List_Sites.lst
[Programs] 1600
[Paper_Reports]
Executive_Table_Paper_Reports.exe
Comparison_table.exe
[Web_Reports]
APPENDER.mdb
Chart_Generator.exe
Executive_Table.exe
DataTable_Creator.exe
Data_Calculator.exe
ProcDistrib_Creator.exe
[Template] 1700
Age_Distribution2.html
Anest.html
Anest2.html
ind.html
ind2.html
index-Old.html
loopback.html
main-Old.html
main-Template.html
main.html
Payor.html
Payor2.html
RecovTime2.html
SurgTime2.html
[All]
index-Old.html
main-Old.html
main-Template.html
main.html
[Img]
[centers]
AAA.jpg
XYZ.gif
[NewCenterTemplateFolder]
[Download]
[Month]
[MonthCumul]
[Quarter]
index.html
main-Old.html

FIGURE 6

Name of field	Allowed values	Description
CalculationDate	mm/dd/yyyy	The report system works in the following way: by default, it determines the current periods for Quarterly and Monthly reports using the current system date. For example, when you run the report system on 9/30/1999 as the "current month" for reports, it uses the 8th month (August) and as the "current quarter" it uses the 3rd quarter (from June to August). SOIX generates reports on the 15th day of each month and this does not create any problems, but if one of the centers requests to generate reports before the 15th day but after the 1st day of a month then in this case, by default, the report system will use the previous month as the "current month". And this is not what we want because it is too early to generate the new reports (there is no patient interview records for most medical records) – we just want to recalculate the existing reports. So, to solve this problem, this parameter was introduced. If this parameter has empty value then SOIX report system uses the system date as the "current date", if it is not empty then it uses a value of this parameter. Also this parameter is required to generate sample reports. There is a special version of "soix.mdb" file for sample reports. All records in this database are dated before June 1999, so if the system date is used as the datum then only reports for previous periods can be generated, but if you make the CalculationDate equal to any day in June then May is treated as the "current month".
MinNumberOfCases	Integer	Only procedures that have "MinNumberOfCases" or more cases are shown in the "The Executive Benchmark Table" and in the paper reports.
Confidence	Real	This is a coefficient before standard deviation to calculate tolerable limits.
FoundationDate	mm/dd/yyyy	This date is used as the beginning date for the cumulative reports.
QuarterlyReports	Yes, No	Generate quarterly reports?
QuarterStart	1,2,3,4	Beginning quarter for quarterly reports
QuarterYearStart	yyyy	Beginning year for quarterly reports
QuarterEnd	1,2,3,4	End quarter for quarterly reports
QuarterYearEnd	yyyy	End year for quarterly reports
MonthlyReports	Yes, No	Generate "current month reports"?
MonthStart	1-12	Beginning month for "current month reports"
MonthYearStart	yyyy	Beginning year for "current month reports"
MonthEnd	1-12	End month for "current month reports"
MonthYearEnd	yyyy	End year for "current month reports"
CumulativeMonthlyReports	Yes, No	Generate "cumulative reports"?
CumulativeMonthStart	1-12	Beginning month for "cumulative reports"
CumulativeYearStart	yyyy	Beginning year for "cumulative reports"
CumulativeMonthEnd	1-12	End month for "cumulative reports"
CumulativeYearEnd	yyyy	End year for "cumulative reports"
RunMode		Currently this parameter is not used.
CleanedDB?		Currently this parameter is not used.
StandardReport	Yes, No	Currently this parameter is not used.
StartDate	mm/dd/yyyy	Currently this parameter is not used.
EndDate	mm/dd/yyyy	Currently this parameter is not used.

FIGURE 7

Name of field	Allowed values	Description
Shared parameters that are used by all modules.		
INIPath	A path to a directory.	A path to the folder where INI config files are located.
LogPath	A path to a directory.	A path to the folder where LOG files will be created.
MDBFile	Full path to a file	Full path to the report master database.
LSTPath	A path to a directory.	A path to the folder where LST files are located.
OMS2ArchiveDirectory	A path to a directory.	This parameter was used when OMS 2.0 was used as a front end, so now the parameter is not used.
OMS2BackupDirectory	A path to a directory.	This parameter was used when OMS 2.0 was used as a front end, so now the parameter is not used.
TemplateDirectory	A path to a directory.	A path to the folder where HTML template files are located.
UploadDirectory	A path to a directory.	A path to the folder where centers upload incremental files.
InternetDirectory	A path to a directory.	A path to the folder where centers reports are located.
Parameter used by the paper report modules only		
NewReportsInternetDirectory	A path to a directory	A path to the folder where new reports will be generated. This parameter was introduced as the report generation process takes a lot of time and there is a probability that centers may access their reports during this process. In this situation centers will not be able access their reports at least, but at the same moment there is a probability that these actions may interrupt the report generation process.
SavePathForPaperReport	A path to a directory	This parameter points to the path where paper report will be generated.
Target	"Web" or "Folder"	This parameter defines the way in which the paper report will be generated. When it is equal to "Folder" than these reports are placed in the separate folder defined by "SavePathForPaperReport" parameter. If this parameter is equal to "Web" than the paper report files will be placed in the centers folders like the modules that generate web-reports do. This option allows to make these reports available for the access trough the Internet.
Parameters used by "New_Center_Prepare" module		
NTSecDirectory	Name of folder	This parameter defines a name of the folder where programs from the NTSEC pack are located. These programs are used to set up Windows NT permissions for the centers' upload folders.
ApacheUsersFile	Full path to a file.	This parameter defines a full path to apache users file that will created from scratch by the "New_Center_Prepare" module.
ApacheUsersFile	Full path to a file.	This parameter defines a full path to Apache users file that will created from scratch by the "New_Center_Prepare" module. This file is used to restrict an access to member sites.
ApacheGroupsFile	Full path to a file.	This parameter defines a full path to an Apache groups file that is used to restrict an access to member sites.
NewCenterTemplateFolder	A path to a folder	This parameter points to a directory where template files are stored. These files are used to create sites for new centers.
PrepareUploadStuff	"Yes" or "No"	Prepare "upload" folder for a new center?
PrepareDownloadStuff	"Yes" or "No"	Prepare "download" folder for a new center?
PrepareHTMLFiles	"Yes" or "No"	Prepare index HTML files for a new center?

FIGURE 8

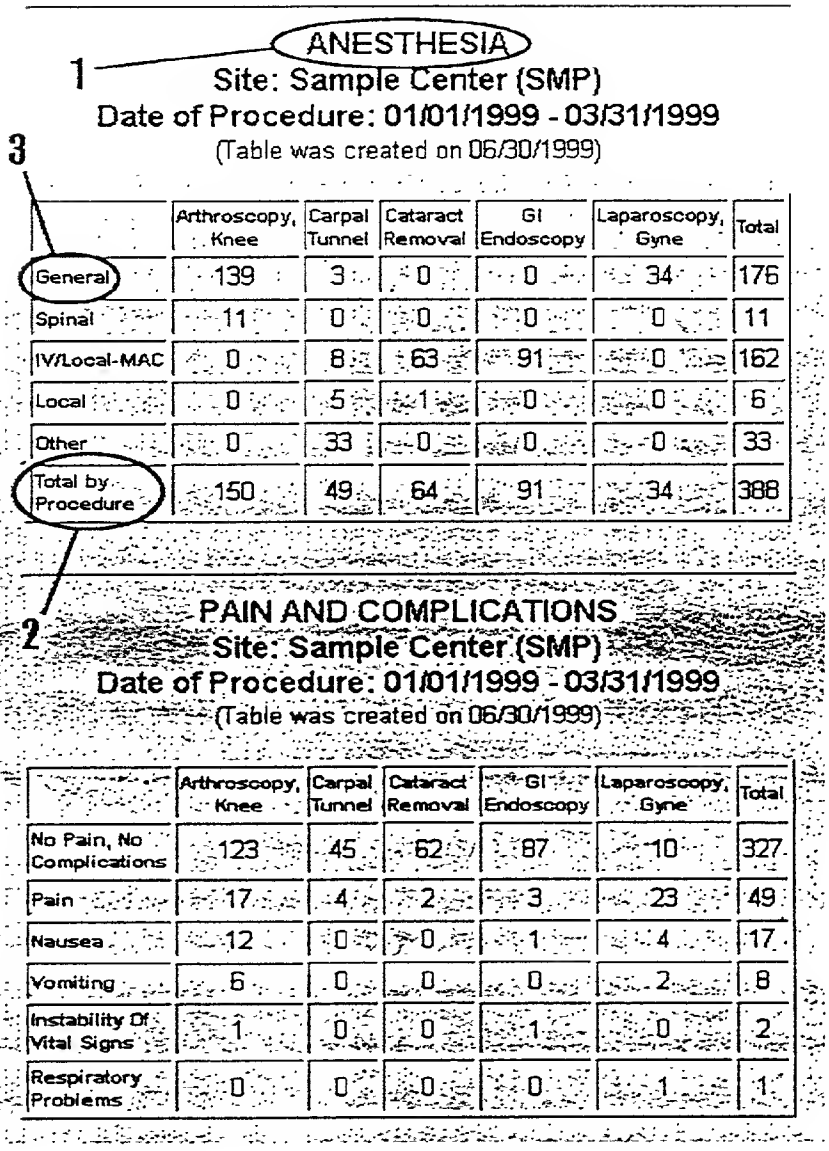
Name of field	Allowable value	Description
Indicator_Name	The same restrictions as whose for field name in MS Access	This is a name of the indicator, this name is used for internal purposes of "Executive_Table" module and as a link to the HTML file that describes the indicator. In Fig. 5, the label number 2 shows the place where this text is used. Some HTML tags may be used (Example: , <i>, <font>), as this text is inserted directly in html files without any parsing.
Numerator	the name of a field from "*_dump.mdb" tables	This field is used as the numerator to calculate an indicator. Expression that is used to calculate indicators is the following: Indicator = Numerator/Denominator*100%
Denominator	the name of a field from "*_dump.mdb" tables	This field is used as the denominator to calculate an indicator. Expression that is used to calculate indicators is the following: Indicator = Numerator/Denominator*100%
Description	any text string	Description of the indicator. In Fig. 5, the label number 1 shows the place where this text is used. Some HTML tags may be used (Example: , <i>, <font>), as this text is inserted directly into html files without any parsing.
MinOrMax	"Min", "Max"	Use "Min" for indicators that should be minimized and "Max" for indicators that should be maximized.
Link	a path to a html file	A path to the html file that describes this indicator. (Example: "/genrep/ind1.html")

FIGURE 9

Name of field	Allowable value	Description
Name_of_Table	Any text	Name of a table. In Fig. 6, the label number 1 shows the place where this text is used. Some HTML tags may be used (Example: , <i>, <font>), as this text is inserted directly into an HTML file without any parsing.
Total_by_Proc_Flag	"TotByProc", ""	If this field equals to "TotByProc" then the last row "Total by Procedure" is calculated for this table, if this field is empty then this last row is not calculated. See Fig 6 labels 2.

Name of field	Allowable value	Description
Name_from_Dump_DB	the name of a field from "*_dump.mdb" tables	Module DataTable_Creator takes the value of Name_from_Dump_DB field in "*_dump.mdb" table and puts this value into the table without any modifications and calculations.
Row_Name	Any text	Name of a row. On Fig. 6 label number 3 shows the place where this text is used. Some HTML tags may be used (Example: , <i>, <font>), as this text is inserted directly into an HTML file without any parsing.

FIGURE 10



ANESTHESIA

1

Site: Sample Center (SMP)

Date of Procedure: 01/01/1999 - 03/31/1999

(Table was created on 06/30/1999)

3

	Arthroscopy, Knee	Carpal Tunnel	Cataract Removal	GI Endoscopy	Laparoscopy, Gyne	Total
General	139	3	0	0	34	176
Spinal	11	0	0	0	0	11
IV/Local-MAC	0	8	63	91	0	162
Local	0	5	1	0	0	6
Other	0	33	0	0	0	33
Total by Procedure	150	49	64	91	34	388

2

PAIN AND COMPLICATIONS

Site: Sample Center (SMP)

Date of Procedure: 01/01/1999 - 03/31/1999

(Table was created on 06/30/1999)

	Arthroscopy, Knee	Carpal Tunnel	Cataract Removal	GI Endoscopy	Laparoscopy, Gyne	Total
No Pain, No Complications	123	45	62	87	10	327
Pain	17	4	2	3	23	49
Nausea	12	0	0	1	4	17
Vomiting	6	0	0	0	2	8
Instability Of Vital Signs	1	0	0	1	0	2
Respiratory Problems	0	0	0	0	1	1

FIGURE 11

Name of field	Allowable value	Description
With_Tolerance	the name of a HTML file without extension or nothing	The HTML file must be in the [SOIX_Report_Sytem]\[Template] folder. If this field is empty then the version with tolerance limits of this report is not generated. In the section where folder [SOIX_Report_Sytem]\[Template] is described you can find more information about internal structure of template files. (Example: for "General Indicators" reports with tolerance zone the template file is "ind.html", so With_Tolerance field equal "ind".
Without_Tolerance	the name of a HTML file without extension or nothing	The HTML file must be in the [SOIX_Report_Sytem]\[Template]. If this field is empty then the version with tolerance limits of this report is not generated. In the section where folder [SOIX_Report_Sytem]\[Template] is described you can find more information about internal structure of template files. (Example: for "General Indicators" reports without tolerance zone the template file is "ind2.html", so With_Tolerance field equal "ind2".
Chart_Header	Any text	This text is used as a header in the report chart. See Fig. 7, label 1. To insert "Enter" in this string use "|" (double vertical bar). Also values of the fields from "*_dump.mdb" tables and values of all indicators calculated inside Chart_Generator module can be used. To use them, use the following format: %*Name_Of_Field*ThisSite% for current center and %*Name_Of_Field*AllSites% for all centers (Example: Total Medical Records field has the name TotMR, so placeholders for it will be %TotMRThisSite% and %TotMRAllSites%). In each section of Indicators.lst file, a user assigns names for each indicator that is calculated by Chart_Generator module – although these names and values of indicators are not saved anywhere, you can still use them in Chart_Header field (Example: In section "General Indicators" indicator with name "ind1" is defined, so you can use placeholders %ind1AllSites% and %ind1ThisSite%.)
Chart_Footer	Any text	This text is used as a footer in the report chart. See Fig. 7, label 2. All instruction for Chart_Header field can be used for this field.

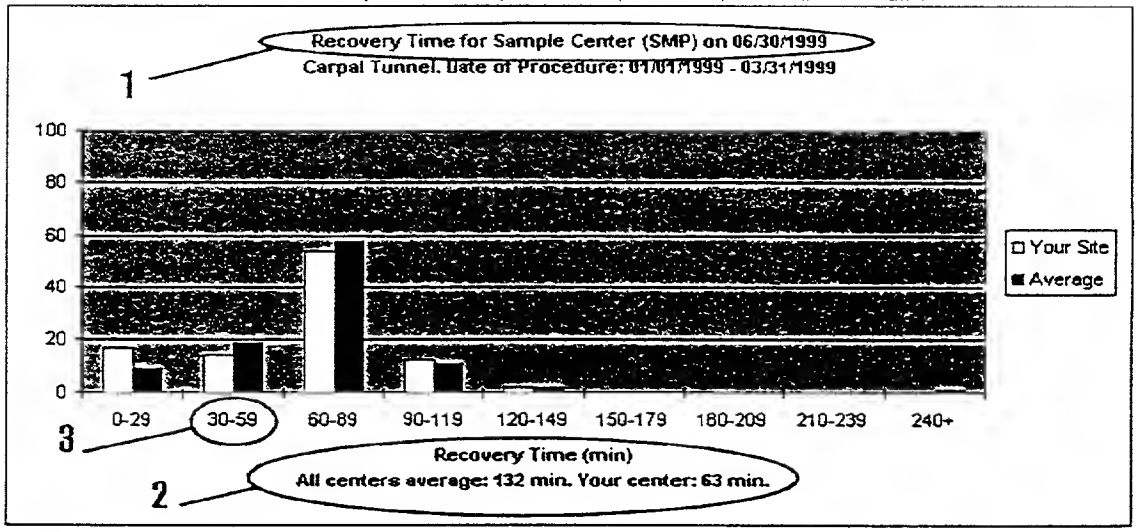
FIGURE 12

Name of field	Allowable value	Description
Indicator_Name	The same restrictions as whose for field name in MS Access	Used for internal calculations only. Make sure that there is no any field in "*_dump.mdb" files with the same name.
Numerator	the name of a field from "*_dump.mdb" tables	This field is used as the numerator to calculate the indicator. The expression that is used to calculate indicators is the following: Indicator = Numerator/Denominator*100%
Denominator	the name of a field from "*_dump.mdb" tables	This field is used as the denominator to calculate the indicator. The expression that is used to calculate indicators is the following: Indicator = Numerator/Denominator*100%
AxesLabels	Any text	This text is used in charts as label of the indicator. To put "*" character use double caret characters ("^^"). See Fig. 7 label 3.

FIGURE 13

Recovery Time

The diagram below shows the *level* of the indicator achieved in YOUR CENTER as a wide white bar.
The AVERAGE level at *all the participating centers* is shown as a blue bar.



	0-29	30-59	60-89	90-119	120-149	150-179	180-209	210-239	240+
All Sites:									
Ratio	8.9	19.0	58.0	10.9	2.0	0.0	0.0	0.0	1.2
Cases for Given Range	44	94	287	54	10	0	0	0	6
Total Cases: 495									
Your Site:									
Ratio	16.7	14.6	54.2	12.5	2.1	0.0	0.0	0.0	0.0
Cases for Given Range	8	7	26	6	1	0	0	0	0
Total Cases: 48									

FIGURE 14

Name of field	Allowable value	Description
Numerator	the name of a field from "*_dump.mdb" tables	This field is used as a denominator to calculate the indicator. The expression that is used to calculate indicators is the following: Indicator = Numerator/Denominator*100%
Denominator	the name of a field from "*_dump.mdb" tables	This field is used as the denominator to calculate the indicator. The expression that is used to calculate indicators is the following: Indicator = Numerator/Denominator*100%. If Denominator is empty then Numerator is used only and the expression becomes as Indicator=Numerator
Descipting_Text	Any text	Name of a row. In Fig. 8 , the label number 2 shows the place where this text is used. Some HTML tags may be used (Example: , <I>, <font>), as this text is inserted directly into an HTML file without any parsing.

FIGURE 15

Comparison Table - Sample Center

YOUR PROCEDURE GROUPS										
3 / 2 / 1	Arthroscopy, Knee		GI Endoscopy		Cataract Removal		Carpal Tunnel		Laparoscopy, Gyne	
	Your Center	All Centers	Your Center	All Centers	Your Center	All Centers	Your Center	All Centers	Your Center	All Centers
Number of Patients	150	1269	91	1372	64	856	49	505	34	388
Time (Minutes)										
Time For Procedure	37	46	176	124	27	26	16	52	31	99
Time For Recovery	98	184	657	454	29	30	63	132	111	362
Time For Patient Interview	4	4	3	3	2	2	4	4	3	3
Problems Before Leaving Surgery Center										
Percent Normal Discharge	100.0	99.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent without Problems	82.0	84.9	95.6	97.1	96.9	96.6	91.8	95.0	29.4	36.6
Percent with Post Operative Pain	53.3	61.2	2.2	1.5	4.7	5.3	18.4	14.9	67.6	60.1
Percent Medications Ordered	100.0	100.0	50.0	50.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent Pain Relieved	96.3	97.7	50.0	50.0	66.7	71.1	100.0	96.0	100.0	100.0
Percent Pain Prescription Given	99.3	99.0	2.2	1.5	3.1	3.0	100.0	97.6	91.2	90.7

FIGURE 16

Name of field	Allowable value	Description
Field_Name	the name of a field from "*_dump.mdb" tables	Use only fields that contain absolute number of cases. In current version of the report system almost all fields satisfy this restriction – only the fields with average times do not satisfy.
Descipting_Text	Any text	Name of the column. In Fig. 9 , the label number 1 shows the place where this text is used. Some HTML tags may be used (Example: , <i>, <font>), as this text is inserted directly into an HTML file without any parsing.

FIGURE 17

Case Distribution
Date of Procedure: 03/01/1999 - 10/31/1999
Table was created on 11/16/1999

1

Procedure Name	Center	Medical Records	Patient Interview
Arthroscopic ACL Repair (1 center)	QCA	2	2
	Total	2	2
Breast augmentation (3 centers)	AAM	10	10
	AAS	19	15
	RSA	1	1
	Total	30	26
	AAD	47	47
	AAE	14	14
	AAL	8	8
	AAS	10	5
Rhinoplasty (2 centers)	Total	10	9
Rhytidectomy (4 centers)	AAE	1	1
	AAM	3	3
	AAS	1	1
	RSA	1	1
	Total	6	6
Grand Total		4,999	4,581

FIGURE 18

Name of field	Allowable value	Description
`Name_of_Field_1`	The same restrictions as whose for field name in MS Access	When you select a name for this field, make sure that this field must be unique among fields in MEDREC table, PATINT2 table and fields defined in `Stage1.lst` and `Stage2.lst` files.
`SQL_Expression`	Expression in MS SQL language	Use help files for MS Access or Visual Basic to get additional information about MS SQL language. In `SQL_Expression` field, you can use `Name_of_Field_1` fields from other strings of `Stage1.lst` file, but be careful and do not create an unsolvable situation when in the current string you use another field, but the `SQL_Expression` for that field uses `Name_of_Field_1` for the current string. This is so called "Circular reference".

FIGURE 19

Name of field	Allowable value	Description
`Name_of_Field_2`	The same restrictions as whose for field name in MS Access	When you select a name for this field, make sure that this field must be unique among fields in MEDREC table, PATINT2 table and fields defined in `Stage1.lst` and `Stage2.lst` files.
`Data_Type_of_Field`	Text, Long, Single	Defines a type of the field. Currently three data types are supported but this list can be easily expanded.
`SQL_Expression`	Expression in MS SQL language	Use help files for MS Access or Visual Basic to get additional information about MS SQL language. Inside the `SQL_Expression` you can use `Name_of_Field` field from other strings of `Stage1.lst` file, but be careful and do not create an unsolvable situation when in current string you use another field, but `SQL_Expression` for that field uses `Name_of_Field` of current string.
`Denominator`	Any item from the `Name_of_Field_2` list	Most of the fields from `Name_of_Field_2` list are absolute numbers of cases, so to get a value for the whole industry, values for different centers must be just summed up. Some of the fields like average times are not applicable to this rule, they contain relative values, so a simple addition cannot be used to calculate the whole industry values. In this case the following mathematical expression is used: $$Ind_{All} = \frac{\sum_{k=1}^{N} (Ind_k \times Denom_k)}{Denom_{All}},$$ where Ind_{All} – value for the whole industry, Ind_k – value for k center, $Denom$ – denominator for the field. So `Denominator` defines a field that is the denominator for a given indicator. If `Denominator` is empty then an ordinary addition is used.

FIGURE 20

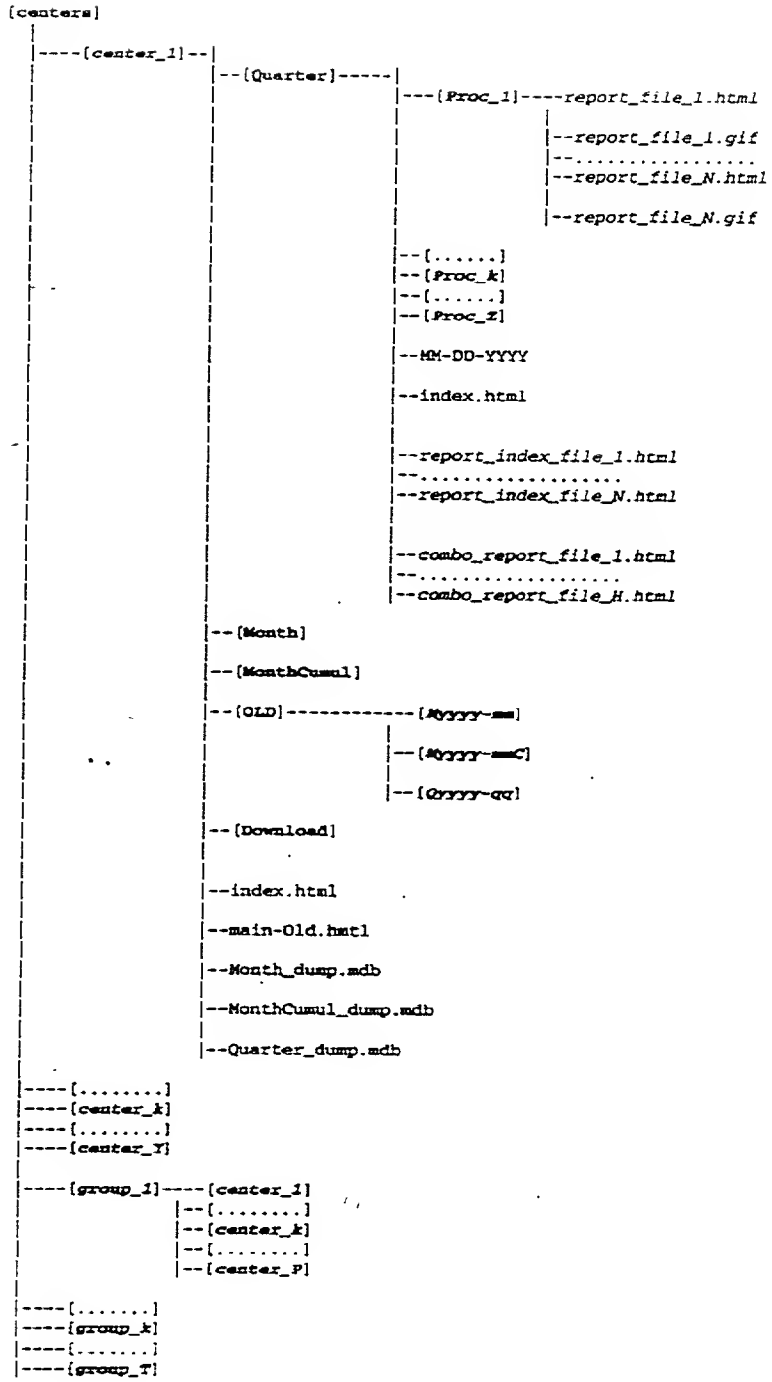

[centers]
[center_1]
[Quarter]
[Proc_1]
report_file_1.html
report_file_1.gif
report_file_N.html
report_file_N.gif
[Proc_k]
[Proc_z]
MM-DD-YYYY
index.html
report_index_file_1.html
report_index_file_N.html
combo_report_file_1.html
combo_report_file_H.html
[Month]
[MonthCumul]
[OLD]
[Qyyyy-qq]
[Download]
index.html
main-Old.html
Month_dump.mdb
MonthCumul_dump.mdb
Quarter_dump.mdb
[center_k]
[center_Y]
[group_1]
[center_P]
[group_k]
[group_T]

FIGURE 21

Sample Center

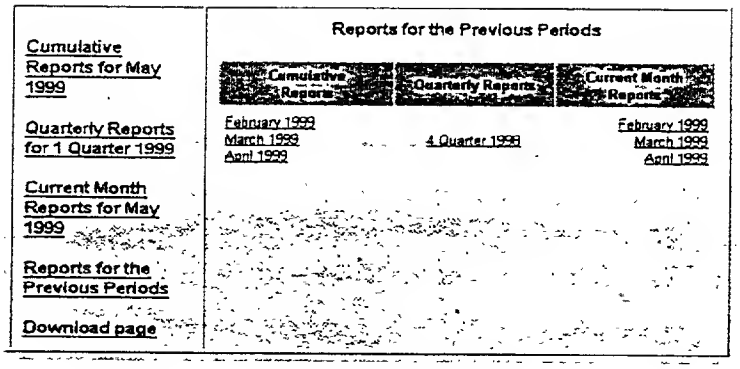
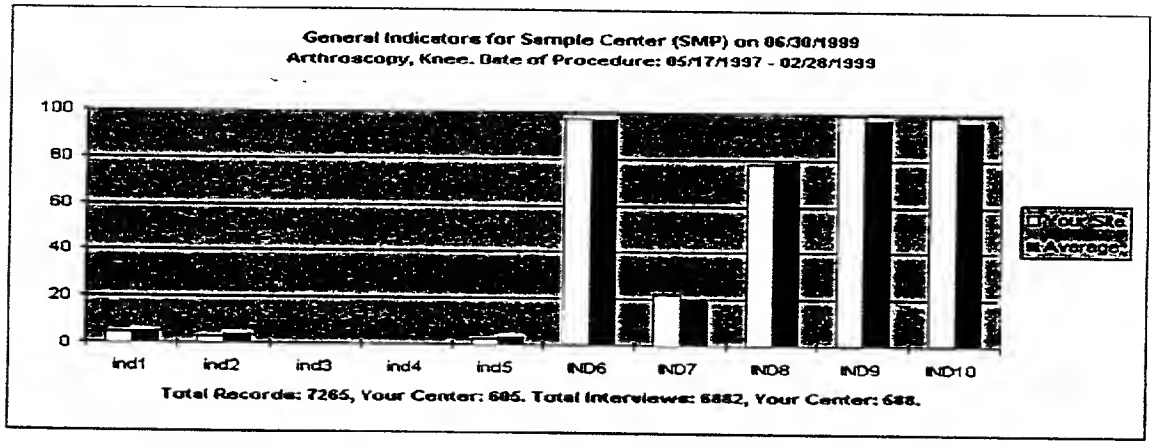


FIGURE 22

Benchmarking Report

The diagram below shows the *level* of the indicator achieved in YOUR CENTER as a wide white bar.
The AVERAGE level at *all the participating centers* is shown as a blue bar.

The values of the indicators shown with small letters (ind1 thru ind5) should be minimal
The values of the indicators shown with CAPITAL letters (IND6 thru IND10) should be maximal



ind1 = Perioperative Complications
ind2 = Delayed in Discharge
ind3 = Returns to Surgery
ind4 = Admits to Hospital
ind5 = Pain Episodes Not Relieved

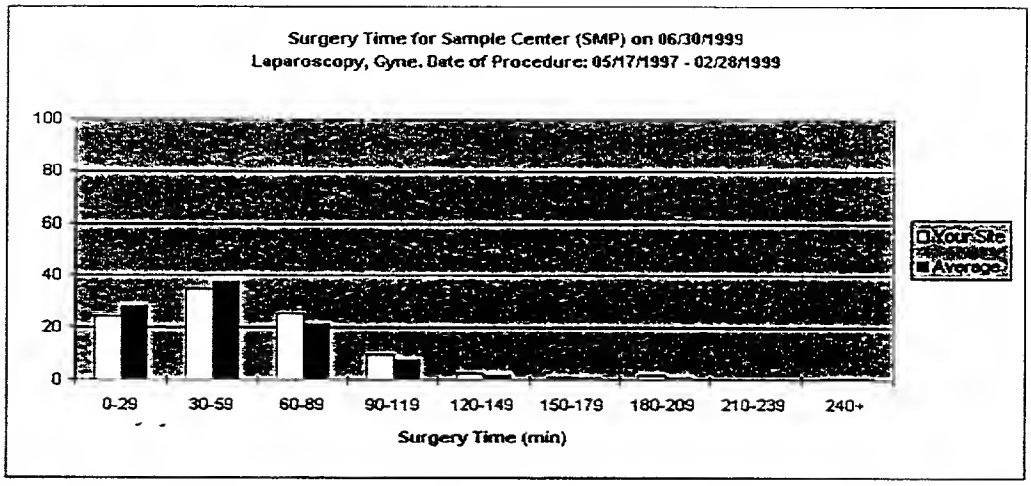
IND6 = Care Not Needed After Discharge
IND7 = Pain Controlled After Discharge
IND8 = Satisfied Patients
IND9 = Effective Discharge Instructions
IND10 = Patients Prepared for Self-Care

	ind1	ind2	ind3	ind4	ind5	IND6	IND7	IND8	IND9	IND10
All Sites:										
Indicator	5.5	4.3	0.0	0.0	3.7	97.2	18.7	78.5	97.1	96.4
Numerator	398	311	0	0	178	6688	873	5399	6685	6637
Denominator	7265	7265	7265	7265	4804	6882	4667	6882	6882	6882
Your Site:										
Indicator	4.8	2.8	0.0	0.0	2.3	97.1	22.1	78.4	98.6	98.1
Numerator	29	17	0	0	10	571	90	461	580	577
Denominator	605	605	605	605	427	588	407	588	588	588

FIGURE 23

Surgery Time

The diagram below shows the *level* of the indicator achieved in YOUR CENTER as a wide white bar.
The AVERAGE level at *all the participating centers* is shown as a blue bar.



	0-29	30-59	60-89	90-119	120-149	150-179	180-209	210-239	240+
All Sites:									
Ratio	28.5	37.6	21.3	7.9	2.0	1.2	1.1	0.0	0.4
Cases for Given Range	717	945	536	199	50	29	27	0	10
Total Cases: 2513									
Your Site:									
Ratio	24.4	35.0	25.4	9.6	2.5	1.0	1.5	0.0	0.5
Cases for Given Range	48	69	50	19	5	2	3	0	1
Total Cases: 197									